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ABSTRACT

The relative and combined effects of short-term group brainstorming practice and video-tape training sessions on brainstorming performance were explored. Two hypotheses were tested: (1) under group and individual conditions, performance should improve with the use of a model of a well trained and experienced brainstorming group, group performance being likely to improve more because of the opportunity to identify with the model; and (2) a short-term practice session would enhance brainstorming performance, again particularly for groups. The 4 rules of brainstorming as described by Osborn (1957) were presented to a student sample . Their task was to generate ideas on possible change tactics in terms of the escalation of the Vietnam war, particularly relevant as Cambodia had been invaded very recently. With the criterion measure as the number of different ideas generated, the superiority of individuals over groups was clearly demonstrated, and the no-videotape condition performed better across all conditions, contrary to expectations. The effect of practice on performance, though positive, was not significant. (KS)

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BRAINSTORMING ON A "HOT" PROBLEM: A COMPARISON OF INDIVIDUAL AND GROUP RESULTS[1]

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Many studies, including Bouchard and Hare (1970), Bouchard (1969), Campbell (1968), Dunnette, Campbell and Jaastad (1963), and Taylor, Berry, and Block (1958), have demonstrated the superiority of "nominal" groups over real groups under brainstorming conditions. Bouchard (1969) commented on the possibility that training might improve the performance of real groups more than that of individuals. Acting on this possibility, we decided to explore the relative and combined effects of short-term group brainstorming practice and video-tape training sessions on brainstorming performance.

Two hypotheses were generated as a result of this decision. One hypothesis was that by providing group and individual conditions with a model of a well-trained, and experienced brainstorming group, performance should improve. Also, we felt that the group condition would improve more than the individual condition on the assumption that the groups could, at the least, identify more easily and completely with the model we had provided. The other hypothesis was that a short-term practice session in group brainstorming would enhance performance, with group performance also improving more than individual performance. This too was based on the assumption that

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the period of group brainstorming practice could be more easily identified with by subjects in the group condition than by subjects in the individual condition. Also the practice period would "break the ice" so to speak and hopefully overcome any initial reluctance or hesitancy about the group situation.

Our procedures enabled us also to look at some implications derived from suggestions by Dunnette et al (1963) that an optimal order for combining group and individual work would be group problem solving followed by individual work. Bouchard (1969) showed under the conditions of his study that a combination of group work followed by individual work was not superior to individual work followed by individual work. Our design permitted us an opportunity to look at group followed by group versus only group work and group followed by individual versus only individual work.

Another main consideration of our study concerned our objections to the tasks that all the studies cited so far had used. In our judgment they were all artifical or hypothetical problems. Argyris (1968) detailed some of the unintended consequences that may occur as a result of subjects' lack of enthusiasm for experimental research. He stated that the degree of these consequences is a result of, among other things, the motivations of the subject and the potency of the research--that is, the involvement it requires of the subject. We decided to exert some control over these factors by using a more relevant task. The relevancy was to be determined by our subjects.

Other studies have used "real-world" tasks in brainstorming situations. Weisskopf-Joelson and Eliseo (1961) used a task involving the creation of brand names for products stating that this was the problem area for which brainstorming was originally developed. Yet we questioned whether this task or similar ones would enhance either the relevancy as perceived by our subjects

or their degree of involvement in the problem. We just couldn't convince ourselves that thinking up brand names for cigars would be viewed as a relevant task by our subject. We concluded that this type of task was no more relevant than the four problems originally set forth in the Dunnette et al (1963) study which have provided the task content for the majority of subsequent studies concerning brainstorming.

Fortunately for our search for a relevant task and unfortunately in many other respects, our government instituted the Cambodian invasion in the spring of 1970. We conducted our study during the "reconstitution period" that followed at the University of California, Berkeley. By explaining to the subjects that their ideas would eventually be made available to a psychology department "think-tank", we were able to obtain a large number of highly motivated subjects, the majority of whom were eager and happy to have an opportunity to express their views in a meaningful and constructive manner. The ideas submitted by our subjects in fact were made available to the aforementioned "think-tank".

The subjects were 96 male and female students who were participating on a voluntary basis. The students were randomly assigned to eight treatment cells in a 2 x 2 x 2 ANOVA. Respectively, the factors were video-tape training, practice, and individual versus group brainstorming. The E was a female research assistant.

All subjects watched a four-minute video-tape containing either group or individual brainstorming instructions. These instructions followed the format of Bouchard and Hare (1970). For instance, the subjects in the individual conditions saw the following instructions being read:

> This is an experimental study of brainstorming. You have probably never worked on a problem in this way, so I will go over the procedure with you. This technique is a form of group interaction, which is used to facilitate the flow of ideas. It is widely used in a large number of U.S. corporations, and is generally used when

> new, unique, original and creative ideas are desired. The following rules are for groups. You will be working alone. However, I want you to apply these rules as best you can while working on the problem. What we are interested in is whether or not an individual can brainstorm and how he does it. The rules are as follows:

Then followed the four major rules of brainstorming as described by Osborn (1957). The instructions were appropriately worded in a similar fashion for the group condition. If the subjects were to participate in the film condition they then saw the following being read:

> You will now see a video-tape of a well-trained experienced brainstorming group in action.

The subjects in the film condition then saw a 10-minute video-tape of a smoothly functioning, rapid idea-generating brainstorming group working on the People problem described in Dunnette et al. (1963). After this video-tape all subjects were handed the following written instructions:

> Now we would like you to try the same brainstorming technique you saw in the film. To summarize, the brainstorming procedure is as follows: (Osborn's four rules were repeated.)

If they were to perform in the individual condition they read the following:

> Instead of working in a group, we would like you to brainstorm individually writing down all your own ideas and proceeding according to the brainstorming principles. The experimenter will remain present during the session: Don't let this distract you.

If the subjects were to participate in the practice session they worked on the following problem for a period of 10 minutes followed by another 25 minutes working on the same problem. If they were not in the practice session, they worked on the problem for a straight 25-minute period. The instructions were as follows:

> You will now have 25 minutes to work on the following problem: Given the current situation of an escalation of the war and the widespread intense reaction across this country, what can you as an individual do to effect change and what things would you change? Since this is an emotionally charged issue, it is especially difficult to keep from making value judgments, but please try to concentrate on generating new ideas rather than on criticism and evaluation of the same idea.

Our criterion measure was the number of different ideas generated. Our scoring system was patterned after the comprehensive rules developed by Bouchard (1970). As a check on the scoring system, a reliability coefficient for two scorers on a random sample of 40 subjects was computed--it was .96. As a result, the ratings of only one scorer were used.

Results

The data were analyzed using BMD 02V Analysis of Variance for Factorial Design, Health Sciences Computing Facility, UCLA. Results are presented in Tables 1, 2, and 3.

Once again, the superiority of individuals over groups was clearly demonstrated. The other significant main effect was due to the video-tape training. However, our hypothesis concerning the effect of such training was not confirmed. As Table 2 shows, the no video-tape condition performed better than the video-tape condition across all conditions. Figure 1 shows that the groups were differentially helped by the video-tape, but only to the extent that their performance was not diminished as much as the individual effort in the film condition.

One possible explanation is that the video-tape model we provided was inappropriate for both individuals and groups because it provided a picture of a "perfect" group which made no mistakes and functioned too smoothly. Our subjects may have felt that under the conditions of our experiment such a performance was unattainable to them. The differential performance among individual conditions may have been due to the added feeling of inappropriateness of brainstorming alone after watching a group performance.

The effect of practice was not significant, although there was a tendency for the practice session to improve performance. It is interesting

to note the results of the interaction between video-tape and practice shown in Figure 2. Note that the means are lower in both practice and no practice conditions under the video-tape condition. In the no video-tape condition the effect of practice results in a much higher level of performance. This tends to corroborate the trend noted earlier that the practice session might be of benefit but that the beneficial effect is greatly reduced or confounded when presented after a video-tape model.

It may be that the order of these two conditions--video-tape and practice--is important. In all treatments employing both variables the video-tape exposure preceded the practice session. Subjects may have felt after the practice session that their performance did not match the video-tape performance and consequently did not perform as well during the experimental session. In the same vein, the subjects in the no video-tape condition had no way of knowing if their performance was good or bad and as a result were positively influenced by the practice session.

Table 3 presents the cell means for each condition. As noted earlier, the main effect of practice was not significant and neither were the group-group versus group or group-individual versus individual conditions. Yet substantiating the trends noted earlier, the condition having the best performance was the one having individuals brainstorm alone after a practice session without a video-tape session.

Our attempt at enhancing group performance relative to individual performance was clearly unsuccessful. Yet our study did show that a combination of training methods may be less successful than only one method in certain problem solving situations. The experiment also raised severe doubts concerning the validity of using non-relevant tasks under group brainstorming

conditions. The general superiority of "nominal" groups over real groups appears to be even more pronounced when the problem is real and when motivation is high.

Table 1

Analysis of Variance for Total Number of Different Ideas

Source of Variation	df	MS	F
Video-Tape (1)	1	522.67	6.45**
Practice (2)	1	170.67	2.11
Structure (3)	1	8,970.67	110.69***
12	1	504.17	6.22**
13	1	468.17	5.78*
23	1	8.17	0.10
123	1	352.67	4.35
Within Replicates	16	81.04	
Total	23		

* $p < .05$

** $p < .025$

*** $p < .01$

Table 2

Marginal Means

Variable	Categories	Means
Film	Film	29.92
	No Film	39.25
Practice	Practice	37.25
	No Practice	31.92
Structure	Group	15.25
	Individual	53.92

Table 3

Cell Means

Cell Numbers	Video-Tape	Practice	Ind.	Cell Means	Order
1.	X	X		16.33	GG
2.	X	X	X	39.67	GI
3.	X			13.67	G
4.	X		X	50.00	I
5.		X		18.33	GG
6.		X	X	74.67	GI
7.				12.67	G
8.			X	51.33	I

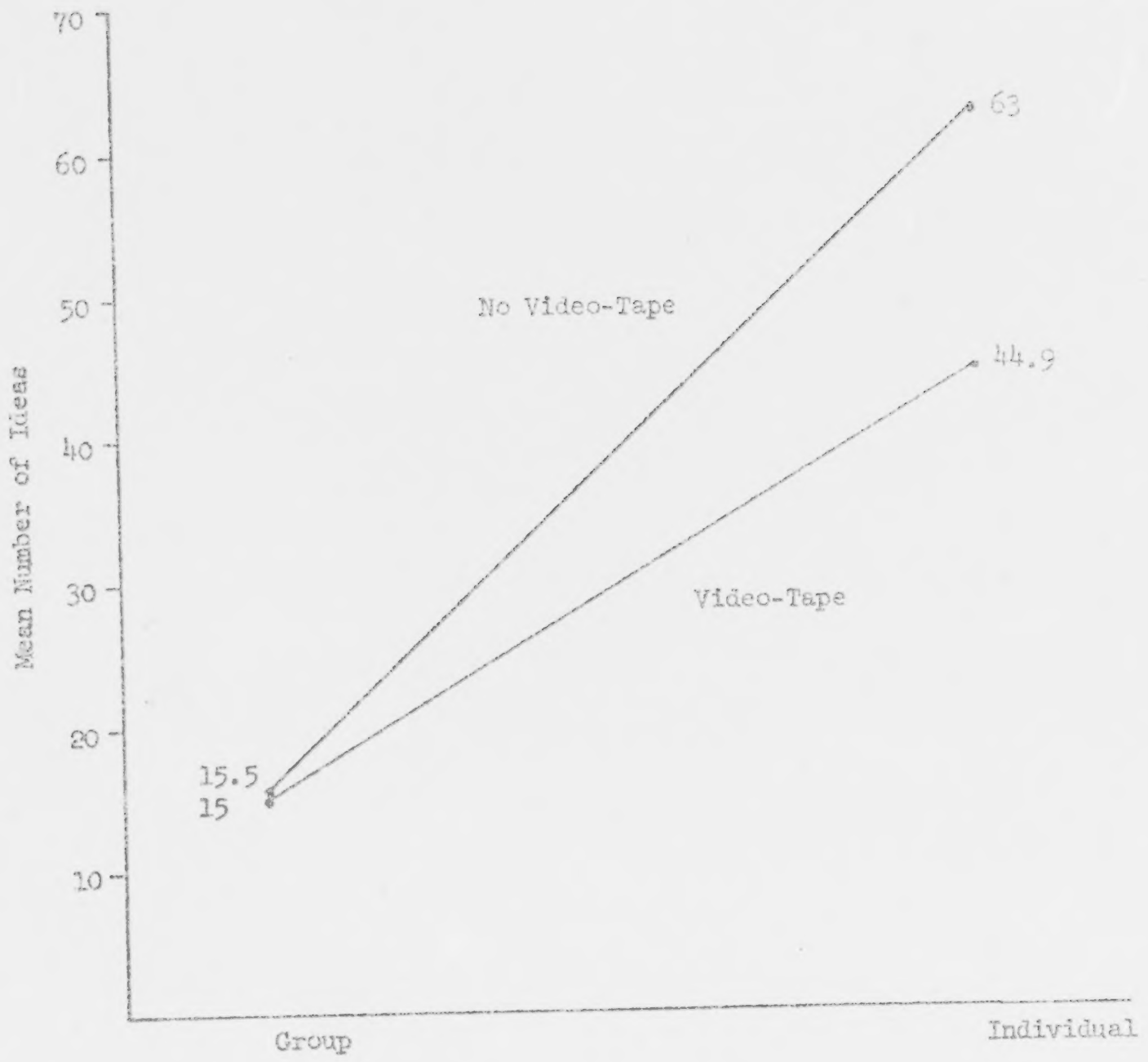

Fig. 1: Mean number of ideas for video-tape versus group/individual conditions across the practice condition

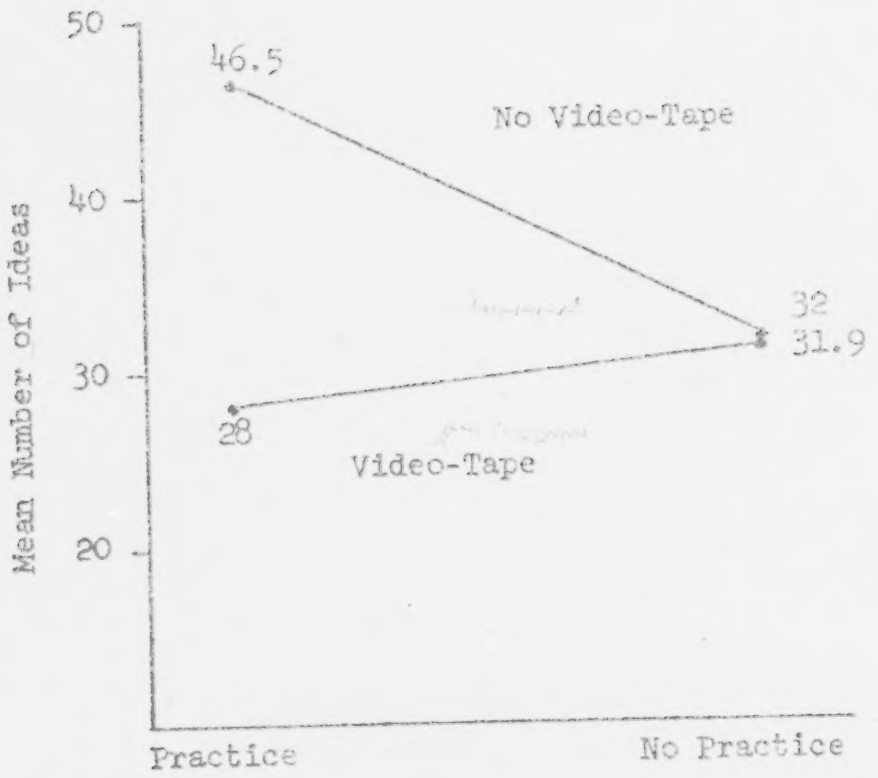

Fig. 2: Mean number of ideas for video-tape versus practice conditions across the group/individual condition

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